

**STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF UNDERGROUND STORAGE TANKS  
TECHNICAL GUIDANCE DOCUMENT - 006**

**Effective Date: January 1, 1994**

**RE: Standard Drilling Log**

The purpose of this Technical Guidance Document (TGD) is to provide a standard drilling log which shall be completed for all borings and monitoring wells installed during site investigations. The drilling log has been developed to ensure that appropriate observations are made during boring and/or monitoring well installation activities and to provide consistency for facilitating a more timely review. Legible hand drafting is acceptable.

The attached drilling log shall be used. The drilling log may be copied or is available from the Division on a diskette. The sections shall be completed as follows:

- |                                  |   |
|----------------------------------|---|
| <u>Facility Name:</u>            | Facility name where the tank(s) are/were located  |
| <u>TN Fac. ID #:</u>             | Seven digit number assigned to the facility by the Division   |
| <u>Well # &amp;/or Boring #:</u> | Well and/or boring number consistently referenced throughout all reports and plans                          |
| <u>Location Map:</u>             | Site sketch locating the well or boring in relation to buildings, tank pit(s), and other important features |
| <u>Start Date &amp; Time:</u>    | Date and time that drilling began   |
| <u>Comp. Date &amp; Time:</u>    | Date and time of boring or monitoring well completion   |
| <u>Logged By and Lic. #:</u>     | Name and license number of the individual logging the well and/or boring                                    |
| <u>Driller:</u>                  | Driller's name and name of drilling company   |
| <u>Drilling Method:</u>          | Drilling method(s) used to complete the boring or monitoring well   |
| <u>Project #:</u>                | Section provided for the convenience of the company or professional completing the log                      |
| <u>Elev (MSL):</u>               | Elevation of the top of the boring or monitoring well referenced to MSL                                     |

<u>T.D. (MSL):</u>	Elevation of the bottom of the boring or monitoring well referenced to MSL
<u>Comments:</u>	Any pertinent information not included in the columns provided on the log
<u>MSL:</u>	Mean sea level elevation in feet for ground level, top of well casing, top of screen, bottom of screen, and bottom of well
<u>Completion Diagram:</u>	Detailed monitoring well schematic which shall indicate but not be limited to the type and diameter of the well, borehole diameter, depth of borehole, depth of well, type of casing and screen, slotted screen size, grain size of sand pack, depth to top of screen, depth to top of sand pack, and depth to top of bentonite seal (Symbols in Table 1)
<u>Water Level:</u>	Water level first encountered and at completion of the well (Symbols in Table 1)
<u>Penetration Rate:</u>	Blow count, min./ft., etc.
<u>Depth:</u>	Depth in feet below ground level (the log shall be scaled 4ft./in.)
<u>Graphic Lithology:</u>	Soil and/or rock lithology including secondary porosity, fossils, intrusions, and structural defects (Symbols in Table 2)
<u>OVD:</u>	Organic Vapor Detector reading from headspace analysis
<u>Samples &amp; Cores:</u>	
<u>Type</u>	Type of sample or core indicated as: SS - Split spoon ST - Shelby Tube CS - Continuous sample RC - Rock core
<u>Int/Rec</u>	Sample location and/or interval for analytical or physical testing or description and recovery. Symbols are shown in Table 1.
<u>Anal.</u>	Sample taken for analysis and indicated as shown in Table 1

Description: Description of the soil and/or rock including but not limited to:

- a. Rock Type/Soil Type Primary and secondary lithologies
- b. Composition/Texture Size and shape of the particles; cement and matrix; fossiliferous (Abbreviations in Table 3)
- c. Strength/Consistency The following modifiers may be used to enhance the soil strength description:  

brittle	fails suddenly with little strain;
elastic	rubbery;
friable	crumbles easily; and
sensitive	loses strength on remolding.

Table 3 lists abbreviations for strength and modifiers. The terms for consistency are presented in Table 4.
- d. Color Table 3 lists abbreviations (It is not necessary to use the Munsell Color Chart Notation)
- e. Moisture Table 3 lists abbreviations
- f. Origin Determine if the soil is residual (weathered in place from parent material) or has been transported and deposited. Transported and deposited soils include alluvium, colluvium, loess, glacial till or drift, and man-made fill. (Abbreviations in Table 3)
- g. Structure Type of bedding, weathering, voids, and secondary porosity (Abbreviations in Table 3)

FACILITY NAME:		TN FAC. ID#:	WELL#: &/or BORING#:	pg 1 of ___
LOCATION MAP:		START DATE & TIME:		PROJECT #:  Standard Boring Log  State of Tennessee Underground Storage Tank Division Department of Environment and Conservation
		COMP. DATE & TIME:		
		LOGGED BY:	TN LIC#:	
		DRILLER:		
		DRILLING METHOD:		
		ELEV (MSL):	T.D. (MSL):	
COMMENTS:				



MSL	COMPLETION DIAGRAM BOREHOLE DIAMETER:	WATER LEVEL	PENETRATION RATE	DEPTH	GRAPHIC LITHOLOGY	OVD	SAMPLES & CORES			DESCRIPTION (Color, Texture, Structure, etc...)
							TYPE	INT./REC	ANAL	
				0						
				5						
				10						
				15						
				20						
				25						
				30						

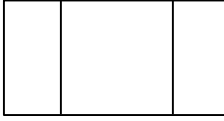
FACILITY NAME:	TN FAC. ID#:	WELL#: &/or BORING#:	pg. --- of ---
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COMMENTS:

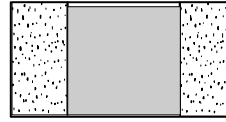
MSL	COMPLETION DIAGRAM		WATER LEVEL	PENETRATION RATE	DEPTH	GRAPHIC LITHOLOGY	OVD	SAMPLES & CORES			DESCRIPTION (Color, Texture, Structure, etc...)
	BOREHOLE DIAMETER:							TYPE	INT./REC.	ANAL.	
<div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>0</span><span>10</span><span>20</span><span>30</span><span>40</span><span>50</span><span>60</span><span>70</span><span>80</span><span>90</span><span>100</span><span>110</span><span>120</span><span>130</span><span>140</span><span>150</span><span>160</span><span>170</span><span>180</span><span>190</span><span>200</span><span>210</span><span>220</span><span>230</span><span>240</span><span>250</span><span>260</span><span>270</span><span>280</span><span>290</span><span>300</span><span>310</span><span>320</span><span>330</span><span>340</span><span>350</span><span>360</span><span>370</span><span>380</span><span>390</span><span>400</span><span>410</span><span>420</span><span>430</span><span>440</span><span>450</span><span>460</span><span>470</span><span>480</span><span>490</span><span>500</span><span>510</span><span>520</span><span>530</span><span>540</span><span>550</span><span>560</span><span>570</span><span>580</span><span>590</span><span>600</span><span>610</span><span>620</span><span>630</span><span>640</span><span>650</span><span>660</span><span>670</span><span>680</span><span>690</span><span>700</span><span>710</span><span>720</span><span>730</span><span>740</span><span>750</span><span>760</span><span>770</span><span>780</span><span>790</span><span>800</span><span>810</span><span>820</span><span>830</span><span>840</span><span>850</span><span>860</span><span>870</span><span>880</span><span>890</span><span>900</span><span>910</span><span>920</span><span>930</span><span>940</span><span>950</span><span>960</span><span>970</span><span>980</span><span>990</span><span>1000</span> </div>											

**Table 1**

**Completion Diagram Symbols:**



**SOLID PIPE WITH NO PACKING**



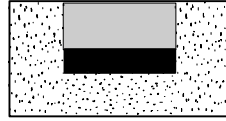
**SLOTTED PIPE PACKED IN SAND**

DOTS (5.X) / DASH (.5X)



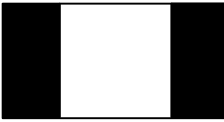
**GROUT SEAL AROUND SOLID PIPE**

ANS131 (1.X)



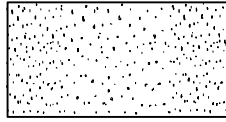
**END PIPE ON SLOTTED PIPE PACKED IN SAND**

DOTS (5.X) / ANS137 (.2X)



**BENTONITE SEAL AROUND SOLID PIPE**

ANS137 (.2X)



**SAND PACK**

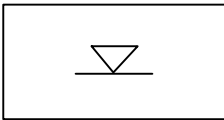
DOTS (5.X)



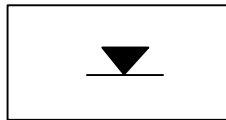
**SOLID PIPE PACKED IN SAND**

DOTS (.5X)

**Water Level Symbols:**



**WATER LEVEL FIRST ENCOUNTERED**



**WATER LEVEL ON COMPLETION**

**Sample Symbols:**

SS- SPLIT SPOON

ST - SHELBY TUBE

CS - CONTINUOUS SAMPLE

RC - ROCK CORE

X - 75-100% RECOVERY

> - 50-75% RECOVERY

< - 25-50% RECOVERY

I - 0-25% RECOVERY

BTX - BENZENE, TOLUENE, & XYLENES

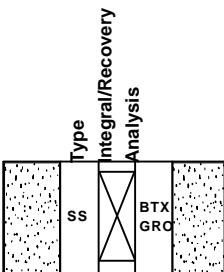
GRO - GASOLINE RANGE ORGANICS

DRO - DIESEL RANGE ORGANICS

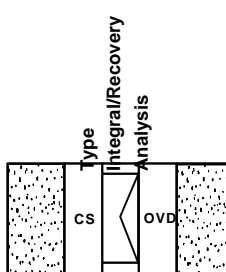
HB+ - METHOD 418.1 OR 503 E

OVD - ORGANIC VAPOR DETECTOR

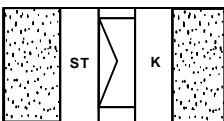
k - PERMEABILITY



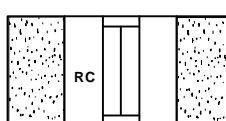
**SPLIT SPOON SAMPLE  
75-100% RECOVERY  
ANALYZED FOR btx & GRO**



**CONTINUOUS SAMPLE  
25-50% RECOVERY  
ANALYZED WITH OVD**

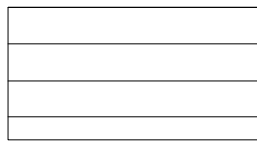


**SHELBY TUBE SAMPLE  
50-75% RECOVERY  
ANALYZED FOR PERM.**



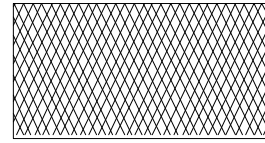
**CORE  
0-25% RECOVERY**

**Table 2**  
**Soil & Rock Lithology Symbols:**



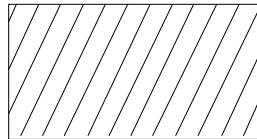
**CLAY**

LINE (.5X)



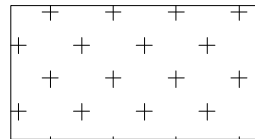
**COAL/LIGNITE**

ANS137 (.2X)



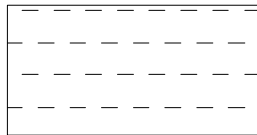
**SILT**

ANS131 (.5X)



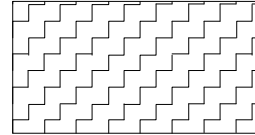
**IGNEOUS**

CROSS (.5X)



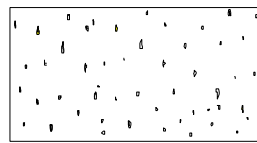
**SHALE**

DASH (.5X)



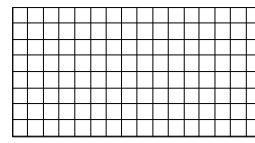
**METAMORPHIC**

ZIGZAG (.5X)



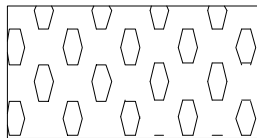
**SAND**

DOT (.5X)



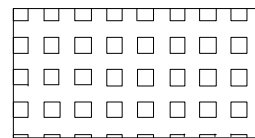
**CONCRETE**

NET (.5X)



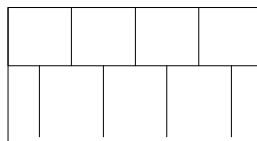
**GRAVEL**

HEX (.3X)



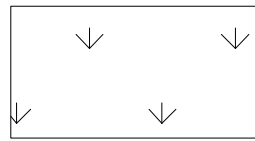
**ASPHALT**

SQUARE (.5X)



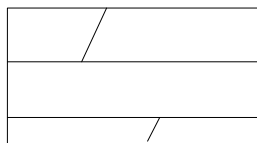
**LIMESTONE**

BRICK (.5X)



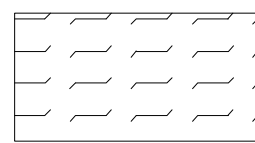
**ORGANIC SOIL**

GRASS (.4X)



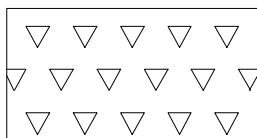
**DOLOMITE**

DOLMIT (.4X)



**FILL**

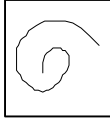
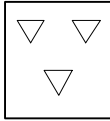
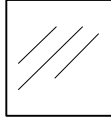
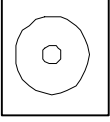

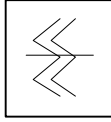
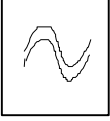
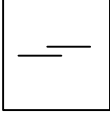

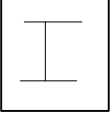
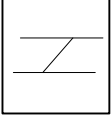
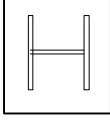
FLEX (.5X)



**CHERT**

TRIANG (.5X)

**Table 2 (continued)**  
**Modifying Components, Cement,**  
**Etc.:**

	<b>FOSSILS</b>		<b>CHERT</b>		<b>SILT</b>
	<b>OOLITES, PISOLITES, CONCRETIONS, ETC.</b>		<b>SAND</b>		<b>FRACTURES</b>
	<b>BEDDING PLANES</b>		<b>CLAY, SHALE</b>		<b>VISIBLE POROSITY</b>  (DESCRIBE IN COMMENTS)
	<b>CALCITE, LIMESTONE</b>		<b>DOLOMITE</b>		<b>HYDROCARBON ODOR OR STAINING, FREE PRODUCT, ETC.</b>  (DESCRIBE IN COMMENTS)

**Table 3**  
**Abbreviations**

COMPOSITION

Bo.= Boulder  
 Gv.=Grave(ly)  
 Sa.=Sand(y)  
 Si.=Silt(y)  
 Cl.=Clay(ey)  
 Pt.=Peat(y)  
 Sh.=Shells  
 Rk.=Rock  
 Wd.=Wood  
 Qz.=Quartz  
 Mi.=Mica(eous)  
 Ca.=Calcareous  
 Og.=Organic(s)  
 Co.=Coarse  
 Md.=Medium  
 Fn.=Fine  
 An.=Angular  
 Ro.=Rounded  
 Gd.=Graded  
 Un.=Uniform  
 Ls.=Loess

Moisture

Dy.=Dry  
 Ms.=moist  
 We.=Wet  
 Sat.=Saturated

Strength

Ls.=Loose  
 Fm.=Firm  
 Dn.=Dense  
 So.=Soft  
 St.=Stiff  
 Hd.=hard  
 Cp.=Compressible  
 Pl.=Plastic  
 F.=Friable

Modifiers

D.=Dark  
 L.=Light  
 H.=High(ly)  
 M.=Moderate(ly)  
 S.=Slight(ly)  
 P.=Partial(ly)  
 V.=Very  
 W.=Well  
 E.=Elastic  
 Sb.=Sub

Origin

Al.=Alluvium(al)  
 Rs.=Residium(al)  
 Fl.=Fill  
 Ru.=Rubble  
 Ts.=Topsoil

Color

Bl.=Blue  
 Bk.=Black  
 Bn.=Brown  
 Gn.=Green  
 Gy.=Gray  
 Or.=Orange  
 Rd.=Red  
 Tn.=Tan  
 Wh.=White  
 Mt.=Mottled  
 Mu.=Multicolored  
 Str.=Streaked  
 Yl.=Yellow

Structure

Bd.=Banded  
 Cv.=Cavity  
 De.=Decomposed  
 Fg.=Fragment(s)  
 Ho.=Homogeneous  
 Jt.=Joint(ed)  
 La.=Laminated  
 Ln.=Lens(es)  
 Sk.=Slickenside  
 Sm.=Seam  
 Sr.=Stratified  
 Vv.=Varved  
 Wt.=Weathered  
 Vd.=Void(s)  
 Fr.=Fracture(d)  
 Fa.=Fault



## Table 4 Terms For Consistency

### Consistency of Predominately Fine - grained Soils (Silts and Clays)

<u>Term</u>	<u>Field Test on Soil</u>
<b>Very Soft</b>	<b>Easily squeezed between fingers</b>
<b>Soft</b>	<b>Molded by light finger pressure</b>
<b>Firm</b>	<b>Molded by strong finger pressure</b>
<b>Stiff</b>	<b>Dented by strong finger pressure</b>
<b>Very Stiff</b>	<b>Dented only slightly by strong finger pressure</b>
<b>Hard</b>	<b>Dented only slightly by thumbnail finger pressure</b>
<b>Very Hard</b>	<b>Difficult to excavate by pick</b>

### Consistency of Predominately Coarse - Grained Soil (Fine Gravels and Sands)

<u>Term</u>	<u>Field Test on Soil</u>
<b>Very Loose</b>	<b>Easily penetrated by 1/2" rebar pushed by hand</b>
<b>Loose</b>	<b>Easy effort to excavate by handshovel</b>
<b>Firm</b>	<b>Easily penetrated by 1/2" rebar driven with 5 lb. hammer</b>
<b>Very Firm</b>	<b>Moderate effort to excavate by handshovel</b>
<b>Dense</b>	<b>Penetrated a foot by 1/2" rebar driven with 5 lb. hammer / Difficult to excavate by handshovel</b>
<b>Very Dense</b>	<b>Penetrated only a few inches by a 1/2" rebar driven with 5 lb hammer / Difficult to excavate by pick</b>